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SUGGESTIONS FOR CATALOGUING OF ANTHROPOLOGICAL MATERIAL¹

By BRUNO OETTEKING

THERE are three viewpoints of special consideration in the laying out of anthropological collections: the utilization of space; ready accessibility; and an adequate and practical cataloguing. The end of such collections lies in their scientific value for purposes of study rather than for exhibition in the Museum sense of the term, with a reservation in favor of a representation of phylogenetic features bearing on man's descent, changes in different stages of life, sexual and racial distinctions, etc. It follows that all material of this kind (skulls, bones, entire skeletons, cadavera and parts thereof) should be kept in such a state of cleanliness and preservation as to render it available for scientific research at any time.

Utilization of space and easy accessibility not only touch upon the matter of the available space, but also upon the inner arrangement of a collection. These points may best be treated with reference to the available space, making allowance for special decisions in special cases.

With regard to an adequate and practical cataloguing system, I should like to make the following suggestions.

I. DESIGNATION OF THE MATERIAL

Besides the consecutive numbers to be catalogued every object should be designated by one or more additional letters in order to facilitate an instantaneous identification. They are to be the first letters of their names in anatomical nomenclature. In case of several or numerous objects belonging to one and the same complex,

¹ For reasons explained in my review of Rud. Martin's "Lehrbuch der Anthropologie" (see *American Anthropologist*, 1915, Vol. 17, N. 4, pp. 751-754) I apply the term "anthropology" only in reference to man's physical traits as manifested in the living (somatology) and the dead (morphology).

like the different bones of a skeleton, the process described regulates itself in a simple way; the catalogue number remains the same for every object of such a complex and is followed correspondingly by the anatomical abbreviation. The following table lists such abbreviations (symbols):—

- 1—Cranium = Cr¹
 - Calvarium = Cm
 - Calvaria = Ca
 - Calva = Cv
- 2—Mandibula = Md
- 3—Vertebrae = V
 - V. cervicales = V/t
 - V. thoracales = V/th
 - V. lumbales = V/l
 } I, II, III, etc.
- 4—Sacrum = Sa
- 5—Costae = Co (I, II, etc.)
- 6—Sternum = St
 - Manubrium = St/m
 - Corpus = St/c
 - Prox. xiphoideus = St/c
- 7—Scapula = Sc
- 8—Clavicula = Cl
- 9—Humerus = H
- 10—Radius = R
- 11—Ulna = U
- 12—Carpus = Cp
 - Cp/n = Naviculare
 - Cp/l = Lunatum
 - Cp/tr = Triquetrum
 - Cp/p = Pisiforme
 - Cp/ma = Multangulum majus
 - Cp/mi = Multangulum minus
 - Cp/ca = Capitatum
 - Cp/h = Hamatum
- 13—Metacarpalia = Mc (I, II, etc.)

¹ As "cranium" involves the state of completeness of this part of the skeleton, a part of a cranium might be referred to it in the designation. A frontal bone would have to be designated thus: 19Cr/fr, and inclosed in brackets in case of defectiveness (see page 401); 19 stands for a number of the catalogue. The designation of parts of the cranium in connection with the symbol of the latter should be written with small initials. Abbreviations for the other parts may be employed in this way: parietale = pt; occipitale = occ; temporale = tp; sphenoidale = sph; maxillare = mx; zygomaticum = zy palatinum = pl, etc., right and left to be distinguished as advised on page 401.

14—Phalanges manus = Ph/m (I, II, etc., a, b, etc.)

15—Pelvis = P

16—Os coxae = Oc

17—Femur = Fe

18—Patella = Pa

19—Tibia = T

20—Fibula = Fi

21—Tarsus = Ts

Ts/t = Talus

Ts/ca = Calcaneus

Ts/n = Naviculare

Ts/cu = Cuneiforme I, II, III

Ts/cb = Cuboideum

22—Metatarsus = Mt (I, II, etc.)

23—Phalanges pedis = Ph/p (I, II, etc.; a, b, etc.)

The application may be illustrated by a few examples. I should mark a cranium in this way: 300 Cr; the lower jaw belonging to it, 300 Md, where 300 stands for the number of the catalogue, Cr for cranium and Md for mandibula belonging to this cranium. In marking skulls I prefer the region of the frontal angle of the left parietal bone underneath and along the sagittal suture, so that

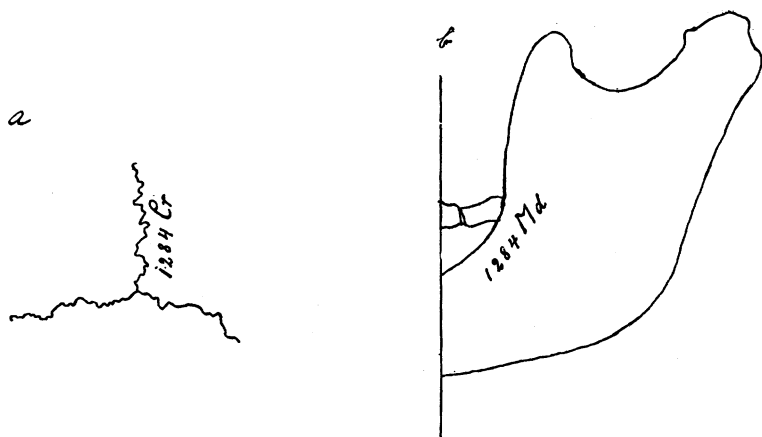


FIG. 48.—*a* is the designation of a skull on the frontal angle of the left parietal below and along the sagittal suture. *b* the designation of a lower jaw on its left ramus (outside) backward and along the linea obliqua.

the designation can be easily noticed. On the lower jaw I put the designation on the outside of the left ramus, backward of and in

line with the *linea obliqua* (fig. 48, *a*, *b*). Similarly favorable places might be selected on the other bones of the skeleton. Inasmuch as bones are not generally exhibition objects, there will be no occasion for their being defaced by applying numbers and letters in conspicuous places.

Right or left should be indicated by adding "d" or "s" (*dexter* and *sinister*), and in case of the sexes being known beyond doubt, by the signs used in biological sciences (♂ for the male, ♀ for the female). A female right femur I should then mark thus: 480 Fe. d. ♀; a male left humerus: 57 H. s. ♂; a male right metacarpal V: 193 Mc. V. d. ♂, etc.

For the sake of completeness I have also given a suitable designation for the small bones of the carpus and tarsus as well as for the phalanges of either (see table). But as these possess only small surfaces, too small to be marked extensively, it may be advisable to collect the bones belonging to such complexes in little boxes or bags and mark the contents on the outside according to the general plan. However, caution must be exercised so as not to mix them up, which can be avoided by marking them at least "d" or "s" (right or left).

In order to make them distinguishable at a glance, the designation of *defective* bones will have to be bracketed. 14 (H. d. ♂) for instance, indicates a defective male right humerus. If portions of this bone were to be designated singly, capital letters of the alphabet should be added: 14 (H. d. ♂) A; 14 (H. d. ♂) B, etc. Two portions of the skull for instance would have to be enumerated thus: 38 (Cr) A; 38 (Cr) B, in which case further signs are unnecessary and the information is found in the catalogue.¹ Such an enumeration applies of course only to cases where a bone cannot be mended because of the lack of the other portions. The fitting together of broken bones should always be executed with the greatest possible care so as to avoid the distortion of the original proportions.

In case of several specimens of a bone being contained in a lot, for instance the contents of a grave, mound, or another circumscribed area, I employ additional small Arabic numerals. I should

¹ See footnote on page 399.

enumerate two lower jaws found thus, as follows: 26 Md. 1, and 26 Md. 2, the anatomical abbreviation to be inclosed in brackets as usual, in case of defectiveness. If two clavicles were found with the lot, a right and a left one, but of different skeletons, their designation would also read: 16 Cl. d. 1, and 16 Cl. s. 2, when the Arabic numerals make clear their belonging to two different complexes. Arabic numerals would have to be added also in case of plurality of bones which according to anatomical nomenclature are distinguished by Roman numerals (vertebrae, costae, metacarpalia, metatarsalia, cuneiformia, and phalanges). Two atlantes of the same find would have to be marked thus: 17 V/c. I. 1, and 17 V/c. I. 2. This holds true also if in a series of bones of the same kind, for instance in the vertebrae, it is found impossible to determine their anatomical number in the special region of the vertebral column. Four thoracic vertebrae answering this condition I should designate in this way: 15 V/th. 1, 15 V/th. 2, etc.; or collectively (in the accession catalogue, see page 404): 15 V/th. 1-4. Vertebrae in complete or incomplete numbers should be strung together in their proper succession and the ends of the cord or wire securely knotted.

Samples of hair should be preserved in little well-corked glass tubes. One should not neglect to enclose with every sample a small slip of paper containing the catalogue number, race extraction, age, etc. With plaster casts or wax casts of parts of the human body alive or dead it will suffice to apply only the catalogue number while again a description should be looked for in the catalogue.

Summarizing the advice given for the designation of anthropological material, I should say:—

1. Objects in a good state of preservation receive (a) the current number, (b) the anatomical symbol, (c) the sign for right or left ("d" or "s"), and (d) the sex sign.
2. Defective objects will have their designations bracketed.
3. Additional current *capital letters of the alphabet* are applied outside the bracket in case separate parts of a broken bone are worth saving.
4. *Additional Arabic numerals* are applied in any case of *plurality or difficult* identification.

II. HOW TO DO THE MARKING

So far as the marking of the material with numbers and letters is concerned, especially in the case of bones, I should recommend a method which has stood the test in the course of my experience. The bones in an anthropological collection are as a rule devoid of their organic substances as a result of weathering or artificial maceration. They are porous and absorb liquids readily, rendering such marking illegible. To avoid this I first apply a thin solution of Canada balsam in xylol on a small area just large enough for the designation. Hereby a substantial basis for the designation in India ink is assured. However, before marking care must be taken to allow the fluid to dry thoroughly. When the ink also has dried up I apply a thin layer of a rather strong solution of celluloid (the crude colorless transparent material in sheet form or scraps) in acetone, which will dry up quite rapidly, protecting the writing henceforth from getting soiled or being blotted out by moisture.¹

A saturated solution of celluloid in acetone forms also a splendid means of gluing together portions of a broken bone. Before being fitted together in their natural shape such portions should be provided liberally with the solution just spoken of on the surfaces of the fracture and be left to dry in a spacious receptacle containing sand or seeds (millet, mustard seed, canary seed, etc.).

I seize here the opportunity of earnestly warning against fastening the teeth to their alveoli by means of glues or other strong adhesives. Teeth treated thus are utterly lost for thorough scientific investigation. In order to secure teeth that have previously fallen out, in their jaws, I use a little plastiline which will afford sufficient support to the teeth and at the same time allow of taking them out again without injury to the alveolar border. It may also be well to collect fallen out teeth in a little box or bag.

I should strongly recommend a method of placing or preserving skulls which I introduced in the collections of the anatomical institution at Heidelberg University which proved useful and is easily established. Every single skull was placed in an open low

¹ This method was originated by Dr. Theodor Mollison in the Anthropological Institute of Zurich University in 1906 and has since proved very useful.

tray. Such a tray consisted simply of a square piece of blackened plate-iron sufficiently large, with the four corners cut out squarely and the edges bent sharply upward. I did not find it necessary to have the corners soldered together as the material is strong enough to stand considerable strain in handling the trays. They cost but very little and even in large numbers the price is merely nominal.¹ Teeth fallen out of skulls that are placed on such trays will not be lost, but stay with the skull to which they belong.

III. CATALOGUING

In the technique of physical anthropological collections the establishment and working of catalogues is as indispensable as in other branches of museum work. I have worked out a device for cataloguing anthropological material, which, if realized, will satisfy both practical and scientific demands. The cataloguing will have to be divided into several distinct sections.

I. THE ACCESSION CATALOGUE

This first section might be enumerated as Catalogue AI, where the letter A stands for Anthropology.² It should be an entirely handwritten one with printed headings. Every incoming object should be registered under its number and the distinctions as suggested above be added. Under other headings should follow the symbols indicating male or female sex, anatomical designations, brief but exhaustive general descriptions, giving the coloring, approximate age, state of preservation, and finally the name of the donor, excavator, whether received in exchange, etc., together with the dates of accession. Some space should be reserved for special remarks. If skulls or their teeth-carrying parts are concerned, a formula of the teeth extant should be inserted in the description column. As the state of preservation is recorded there, every tooth will have to be quoted separately, as either present or absent. For this reason I number the teeth for either half of the jaws beginning with the middle incisors. The numbers running from 1-8 include

¹ Convenient measurements to suit any size of skulls: for the length of the tray 24 cm., width 19 cm., height 3 cm.

² See footnote on page 398.

then for every half of the jaws: two incisors (1-2); the canines (3); two premolars (4-5); three molars (6-8). Teeth wanting or not erupted I mark by an x-shaped cross; or by a continuous line in cases where all the teeth in a half jaw are wanting (see fig. 49).

Num- ber	Sex	Specimen	State of Preservation	Locality	Collector and Date of Accession	Special Remarks
3	♀ (?)	Calvarium	3Cm—Light dirty brown- ish; slightly defective; ab- sence of organic substance. Mature. Teeth: <u>x765432x</u> <u>xx345678</u>	Dinsmore Mound, 4 miles N. of Troy, Doni- phan Co., Kansas	F. H. Sterns 1915	—

FIG. 49.—Showing the division of a page of the accession catalogue and entries under their specific headings.

Deciduous teeth might be distinguished by Roman numerals, while those showing pathological defects be bracketed.

All writings, official papers, etc., referring to a certain object should be preserved in individual, strong, large-sized envelopes. The catalogue number, as well as the date of accession, is in every case to be marked on the outside, preferably on a small extra label at the upper or lower left hand corner. Being a subsection of AI catalogue, this subsection might be referred to as A Ia.

2. THE CARD CATALOGUE

This part of the catalogue designated as AII is to be worked in the sense of a library catalogue. It is meant to give information

a

N. America

<i>United States</i>	<i>Kansas</i> <i>Doniphan Co. 4 miles</i> <i>n. of Troy</i>
<i>Indian (Mound Builder)</i>	
<i>1st Skeleton</i> <i>(incomplete)</i>	<i>Chart I</i> <i>Drawing 5</i>

FIG. 50.—Example of a guide card (a) and a specimen card (b) of regular library card size from a card catalogue of an anthropological collection.

about geographical and racial extraction, and to locate the object. It will best be arranged according to the different parts of the earth with national subdivisions, the former to be the guide cards. On every card, representing only one number of the catalogue, either singly or collectively as the case may be, should be typewritten the nationality, locality, catalogue number of the object, this itself and the exact location in the collection (see fig. 50, *a* and *b*). It will be found advisable to write the latter remark in lead pencil so as to admit of substituting another in case of change of location. The establishment of a special skull catalogue after this device might be considered in connection with the one just described, and referred to as: AIIS (S = skull).

3. THE SCIENTIFIC CATALOGUE

As pointed out above an anthropological collection preferably bears a scientific instead of a museum character. It is for this reason a necessity to bring and keep anthropological material in such a state as to render scientific investigation possible at any time. But of still greater importance seems to me the routine-wise carrying on of such work that in every case precedes the final scientific investigation, *i. e.*, collecting the measurements and drawing diagrams. Such routine work could be done so as to satisfy the prerequisites of any school. So far as the measurements are concerned, an observation sheet similar to or exactly like that given by Rud. Martin for skull or body measurements should be employed. For diagraphical purposes I should recommend the "Kurven-systeme" by P. and Fr. Sarasin,¹ taking the contours of a skull sagittally, horizontally, and frontally at different levels. As these, however, are meant especially for securing a summary of general proportions of the skull, I have for some time employed and found quite useful, a modification of the systems under consideration, which not only serves to indicate the proportions, but can at the same time be used for measuring purposes. Of the sagittal system,

¹ Sarasin, P. and Fr. (1892-3) *Ergebnisse naturwissenschaftlicher Forschungen auf Ceylon in den Jahren 1884-1886*, Vol. 3. See also: Schlaginhaufen O. (1907) "Beschreibung und Handhabung von Rud. Martins diagraphen-technischen Apparaten," in: *Korresp.-Bl. deutsch. anthrop. Ges.*, Vol. 38, pp. 1-6.

I select the medial curve, without doubt the most useful for taking direct as well as angle measurements. An innovation of mine consists in projecting into the median-sagittal diagram, the measuring points of the orbital width and length. Thus the recession of the fronto-sphenoid process of the zygomaticum or the frontal declination of the horizontal orbital axis can be ascertained by measuring the exact distance on the cranial plane of the two verticals on the

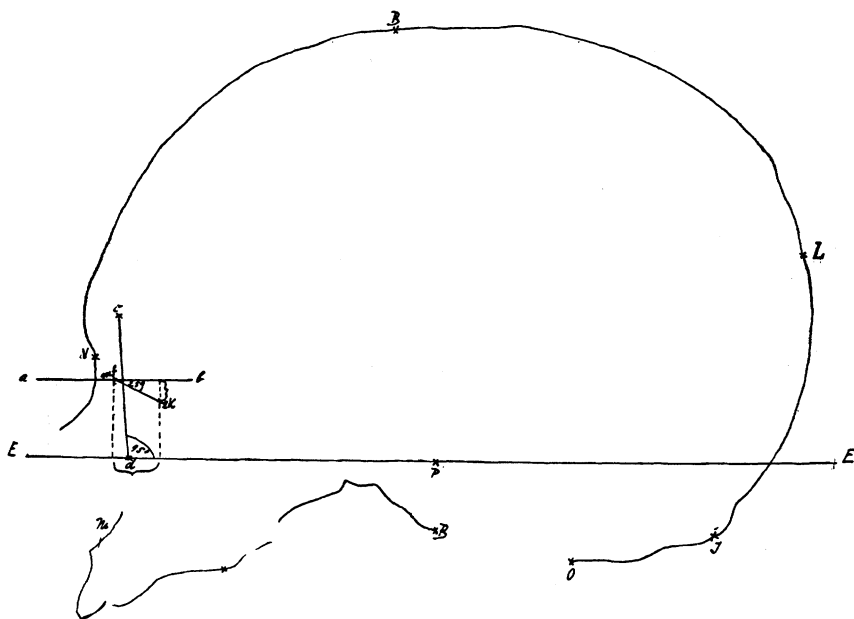


FIG. 51.—Median-sagittal diagram of a skull with orbital measuring points projected into it. $E-E$ = ear-eye plane; $a-b$ = coordinate of ear-eye plane through maxillofrontale; $c-d$ = vertical diameter of orbit; mf = maxillofrontale; ek = ektonchion; $ek-mf-b$ = angle of horizontal declination of orbital width diameter; $c-d-E$ = angle of vertical declination of orbital height diameter. The other letters indicate the well-known anthropological measuring points. Ainu (Japan) 99/1634 Am. Mus. Nat. Hist.

latter from the measuring points of the width. The so-called "frontality" of the orbit (to introduce a new term) is also shown by the behavior of the intersecting line of the orbital height, connecting its two measuring points, in its relation to the medial measuring point (maxillo-frontale) of the orbital width. In cases of pro-

nounced "frontality" it will be found to exceed this point in a forward direction. The orbital height line also forms an angle with the ear-eye plane, determining the amount of vertical declination of the orbital orifice. The amount of declination of the orbital width line to a horizontal plane through the maxillo-frontale can also be measured, either by taking the angle formed by the two projecting lines, or by measuring the exact distance between the lateral measuring point (ektokonchion) and the horizontal plane just spoken of. The latter may be the more reliable measure as the angle indicates a complex one, taking in the different determinations of horizontal and frontal declination which are liable to influence each other considerably. See figure 51, where only the measurements just mentioned are recorded. The great variety of

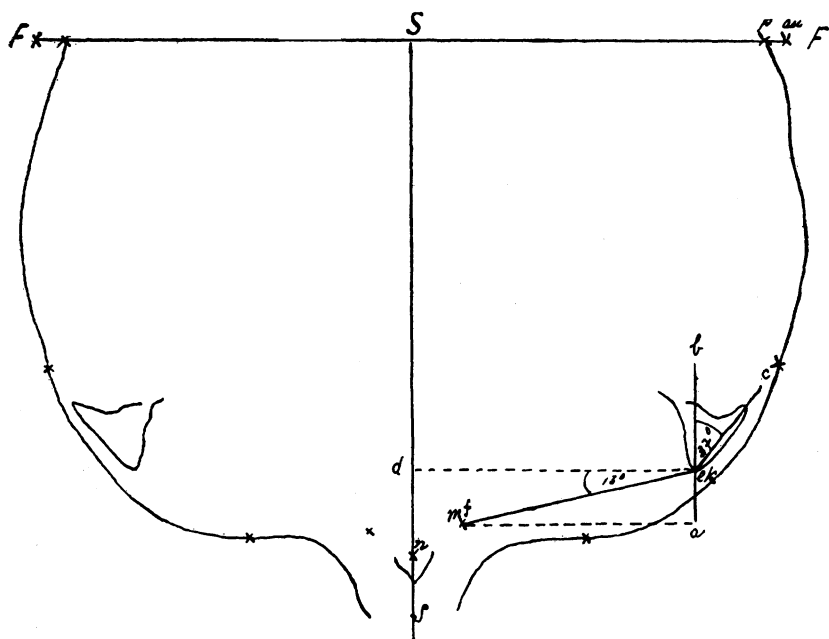


FIG. 52.—Forward half of the horizontal curve in the level of the ear-eye plane (Basalkurve). *S-S* = sagittal plane; *F-F* = frontal plane; *p* = porion; *au* = auricle; *n* = nasion; *mf* = maxillofrontale; *ek* = ektokonchion; *a-b* = coordinate to sagittal plane line through *ek*; *ek-c* = sagittal axis of frontal process of zygomatic bone at the level of the ektokonchion; *d-ek-mf* = angle of frontal declination of orbit.

measurements (direct and angular) of which the median-sagittal diagram admits are not treated there.¹

The basal curve in the level of the ear-eye plane from the horizontal system of curves will afford a good idea of the proportions of the skull in this view. Into this contour I project the position of the nasion, the measuring points of the orbital width and the outline of the nasal bones in the level of the middle of the orbital height ("Augenmitten-Horizontale"). I have found it profitable to draw the outline of the frontal process of the zygomatic bone at the height of the lateral measuring point of the orbital width (ektokonchion) because the angular position of the former to the sagittal plane can thus be easily ascertained. (See fig. 52 and legend.) Other projections of lateral dimensions might be projected into these diagrams as occasions for special investigation arise, especially that of the forward projection of the frontal process of the zygomatic bone, that of the latter itself and its lateral and

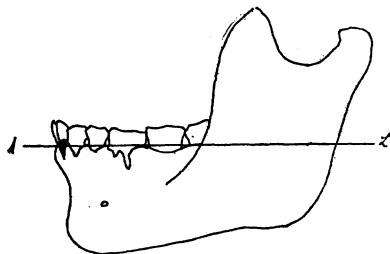


FIG. 53.—Diagram of a lower jaw. A-L = alveolar line through the lowest points of alveoli of the middle incisors and last molar, on which measurements should be orientated.

forward expansion for the investigation of which a useful method is still wanting.² Cross and other sections of other bones of the skeleton may be taken too, and this will touch upon the fundamental reason of drawing diagrams: they will furnish substitutes for exact research in the absence of the object considered. Orthog-

¹ For further reference in this respect consult: Klaatsch, H., 1909, "Kranimorphologie und Kraniotrigonometrie." *Arch. Anthropol.*, N. S., Vol. 8, pp. 1-23.

² After the completion of this paper I became acquainted with a work by Virchow, H., 1915, "Zur anthropologischen Untersuchung des Gesichtsskelettes," *Zschr. f. Ethnol.* Vol. 47, Nos. IV, V, pp. 323-372, treating proportions and angular conditions of the face by means of an ingeniously invented instrument.

onal projections of the lower jaw, giving the outlines in profile are of importance for comparative study (see fig. 53),¹ while the principal measurements of the other bones of the skeleton will suffice to start the scientific investigation proper.

Proposals like these are entirely within the reach of the possible. It is very likely that a lack of leading principles is responsible for the little interest taken in anthropology in this part of the world, and yet, the question as to the physical habitus of the divisions of mankind that people or have peopled this continent deserves at least as much interest as the problems concerning archeology and ethnology; perhaps even more, because the physical being is the carrier of psychical manifestations. Physical investigations undoubtedly have a bearing on cultural questions and this fact establishes their indispensability.

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¹ For methods of investigation on the diagram of the lower jaw, see: Schoetensack, O., 1908. *Der Unterkiefer des Homo Heidelbergensis*. Leipzig; also: Puccioni, N., 1911. "Ricerche sui rapporti di grandezza tra corpore ramo ascendente nella mandibola." *Archivio Antrop.*, Vol. 41, pp. 83-152.